ORDER NO. HAD8601329C0
A2

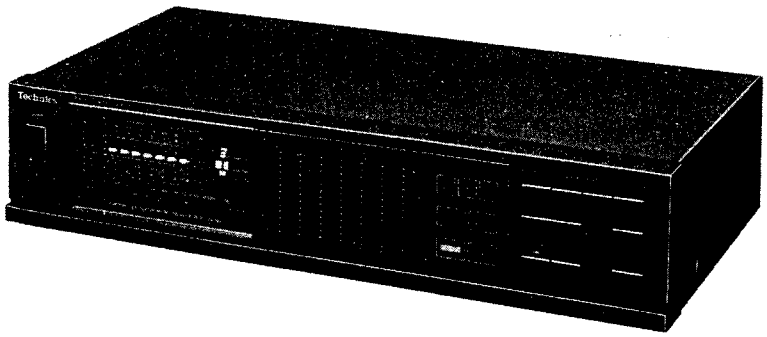
Service Manual

Equalizer

Stereo Graphic Equalizer

(with spectrum analyzer)

SH-8046



Color

(S) . . . Silver Type
(K) . . . Black Type

Color	Area
(S) (K)	[M] . . . U.S.A.
(S) (K)	[MC] . . . Canada
(S) (K)	[E] . . . Continental Europe
(S) (K)	[EH] . . . Holland
(S) (K)	[EB] . . . Belgium
(S) (K)	[EF] . . . France
(S) (K)	[EK] . . . United Kingdom
(S) (K)	[EGA] . . . F.R. Germany
(S) (K)	[Ei] . . . Italy
(S) (K)	[XL] . . . Australia
(S) (K)	[XA] . . . Asia, Latin America, Middle Near East, Africa & Oceania
(S) (K)	[PA] . . . Far East PX
(S) (K)	[PE] . . . European Military

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SPECIFICATIONS

(IHF '78)

Frequency response (center position)	: 10 Hz~50 kHz, −1 dB
Maximum output voltage	: 8 V (1 kHz, THD 0.03%)
Rated output voltage	: 1 V
Rated input voltage	: 1 V
Rated total harmonic distortion	: 0.003% (20 Hz~20 kHz) 1 V output
Input sensitivity	: 150 mV
Signal-to-noise ratio	: above 113 dB/2 V, 107 dB/1 V (IHF'A)
Maximum input voltage	: 8 V (1 kHz)
Input impedance	: 22 kΩ
Gain	: 0±1 dB
Direct-equalization-level controls	: +12 dB~−12 dB (2 dB step)
Center frequency	: 63 Hz, 160 Hz, 400 Hz, 1k Hz, 2.5 kHz, 6.3 kHz, 16 kHz

GENERAL

Power supply	: AC 120 V 60 Hz
Power consumption	: 9 W
(With power switch OFF	: 7 W)
Dimensions (W×H×D)	: 430×97×230 mm (16 15/16"×3 13/16"×9 1/16")
Weight	: 3 kg (6.6 lb)

Specifications are subject to change without notice for further improvement.

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SAFETY PRECAUTION

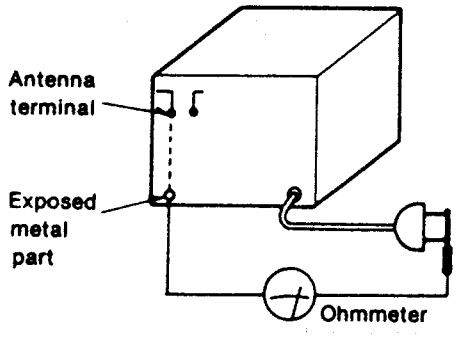
(This "safety precaution" is applied only in U.S.A.)

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

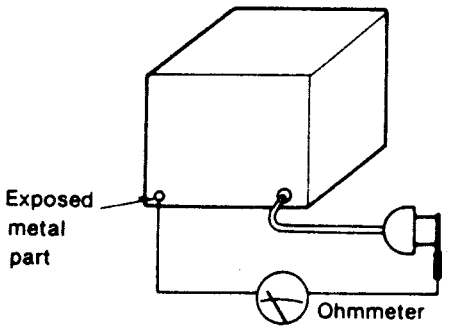
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ



(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

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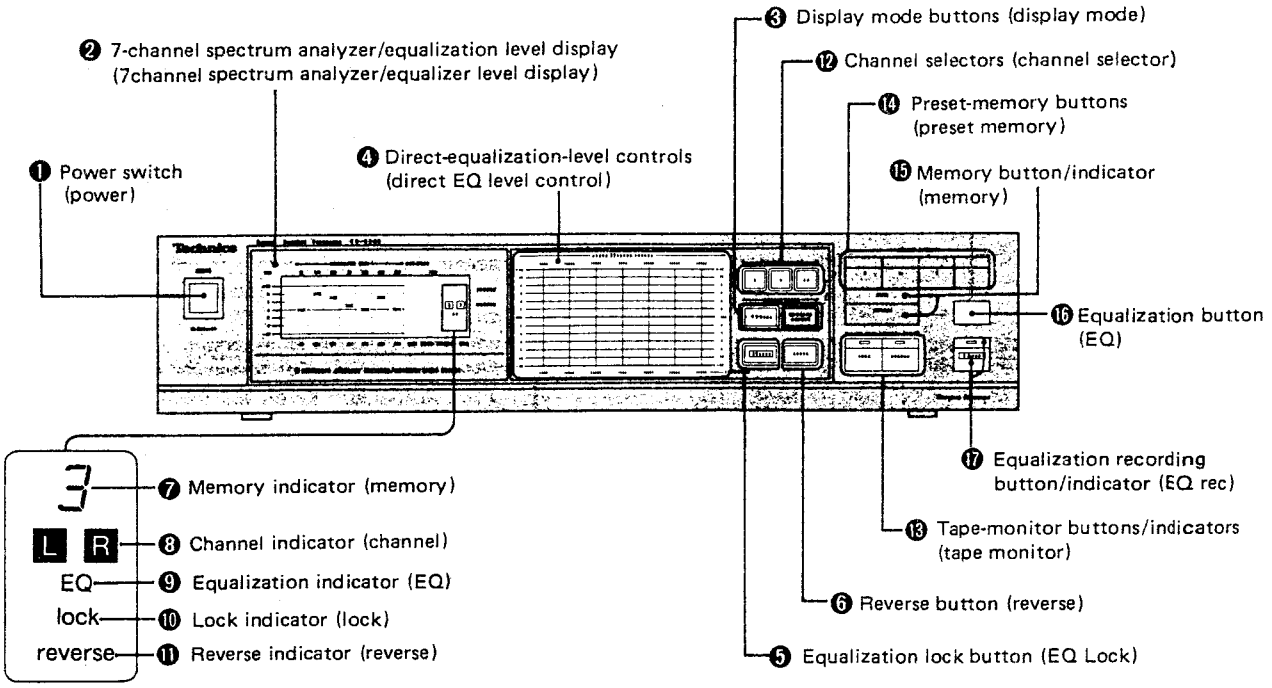
LOCATION OF CONTROLS


❸ Display mode buttons (display mode)
❷ 7-channel spectrum analyzer/equalization level display (7channel spectrum analyzer/equalizer level display)
⓬ Channel selectors (channel selector)
⓮ Preset-memory buttons (preset memory)
❶ Power switch (power)
❹ Direct-equalization-level controls (direct EQ level control)
⓯ Memory button/indicator (memory)
⓰ Equalization button (EQ)
⓱ Equalization recording button/indicator (EQ rec)
❼ Memory indicator (memory)
❽ Channel indicator (channel)
❾ Equalization indicator (EQ)
❿ Lock indicator (lock)
⓫ Reverse indicator (reverse)
⓭ Tape-monitor buttons/indicators (tape monitor)
❻ Reverse button (reverse)
❺ Equalization lock button (EQ Lock)
L R
EQ
lock
reverse

For [M] [MC] only

❶ This switch is used to turn the power on and off.

Note:

- With the power switch in the OFF position, there is still some power consumption (about 7 watts).
  This is to assure the retention of the "most recent" memory and the preset-memory functions.

For except [M] [MC]

❶ This switch turns on and off the secondary circuit power only. The unit is in the "standby" condition when this switch is set to the "⏻" (⇢■) position. Regardless of the switch setting, the primary circuit is always "live" as long as the power cord is connected to an electrical outlet.

Note:

- For this unit, even if this switch is switched to the "standby" position, there is still a slight power consumption of about 6 watts; this is in order to assure the retention of the "most recent" memory and the preset-memory functions.

"Power-through" function

Discs, radio broadcasts, etc. can be heard even though the power of this unit is switched OFF.
When using this feature, set the amplifier's selector to the source you want to hear, and, before switching OFF the power of this unit, set the tape-monitor button to either "source" or "tape".
If a power failure occurs during "power through" operation, switch the power ON and then OFF after the power failure has ended. If this is not done, sound will not be emitted.

❷ This display shows the spectrum or equalization level.
For the spectrum analysis display, a bar-type of display is used; for equalization level display, a dot-type of display is used.

❸ These buttons are used to select either the display of the spectrum or of the equalization level.

EQ level: When this button is pressed, the equalization level is shown on the display.

spectrum analyzer: When this button is pressed, the bar-type spectrum is shown on the display. If this button is pressed once again, the display will return to the dot-type (=).

❹ These controls are used for adjustment of the equalization level.
The adjustment can be made (in 2-dB steps) to ±12 dB.

Note:

Be careful not to scratch the surface by tracing with a sharp edge.

❺ This button is used to lock the direct equalization level control function. Locked when pressed; lock released when pressed again.

❻ This button is used to reverse the equalization curve shown in the display.
This is convenient for reducing tape "hiss" noise, etc.
When this button is pressed, the equalization curve is reversed; when pressed again, the reversing process is released.

❼ Shows the memory number (1 to 4) selected by the preset memory buttons.

❽ Shows the channel (s) (L. R or L and R) selected by the channel selectors.

❾ Illuminates when the equalization button is set to "on".

❿ Illuminates when the equalization lock button is set to "on"

⓫ Illuminates when the reverse button is set to "on".

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⑫ These buttons are used to select the channel for display and equalization correction.

L: When this button is pressed, only the left channel is selected for equalization correction or spectrum display.
R: When this button is pressed, only the right channel is selected for equalization correction or spectrum display.
L.R: When this button is pressed, both the left and right channels are selected for simultaneous equalization correction (left channel bright, right channel dim) or spectrum display. For spectrum display, note that the value is that of the left and right channels combined.

⑬ These buttons are used to select the source to be heard. The indicator for the pressed button will illuminate.
source: Set to this position to listen to equipment (disc player, tuner, etc.) connected to the amplifier.
tape: Set to this position to listen to the tape deck connected to this unit, or to monitor a recording in progress.

Note:
Equalization correction is applied to monitored tape sound, but is not applied to the recorded sound.

⑭ These buttons are used to preset the equalization curves into the memory. After curves have been preset into the memory, it is then possible to quickly and easily select the desired curve by simply pressing the corresponding button. Four equalization curves can be memorized.

⑮ To enter an equalization curve into memory, first press this button, and then, while the indicator is flashing (about 4 seconds), press one of the preset-memory buttons to complete the memorization of the equalization curve.

⑯ This button is used to switch the equalization correction function ON and OFF.
When this button is pressed, the indicator will illuminate; when it is pressed once again, the function is switched OFF, and the equalization function is not applied.

⑰ Press this button to record the sound corrected by the equalizer. When the button is pressed, the indicator will illuminate: when it is pressed once again, the function is switched OFF, and equalization-corrected sound cannot be recorded.

Note:
For equalization recording, be sure to set the equalization button to "on" and the tape-monitor button to "source".

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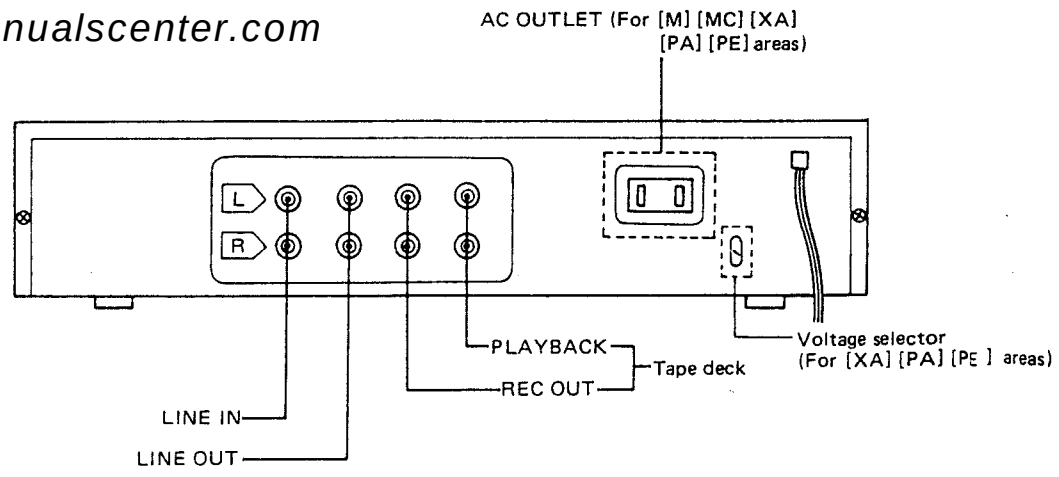
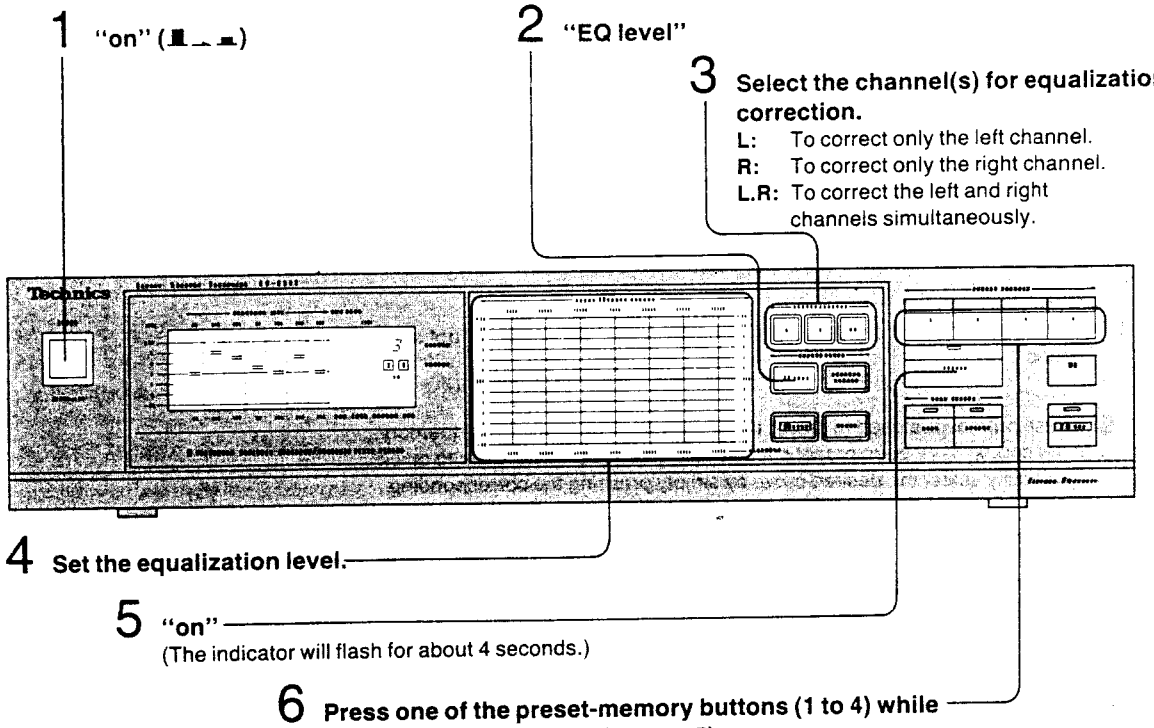


OPERATION

MEMORIZATION OF EQUALIZATION CURVES

For this model, four groups of equalization curves (in left/right pairs) can be stored in memory. After curves have been entered into memory, any one of them can be easily retrieved by simply pressing one of the preset memory buttons.


1 "on" (▮_▬)
2 "EQ level"
3 Select the channel(s) for equalization correction.
L: To correct only the left channel.
R: To correct only the right channel.
L.R: To correct the left and right channels simultaneously.
4 Set the equalization level.
5 "on"
(The indicator will flash for about 4 seconds.)
6 Press one of the preset-memory buttons (1 to 4) while the indicator is flashing (in step 5).

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※If you want to change (re-draw) any of the equalization curves stored in the memory, follow steps 2 to 6 above again.

MEMORY RETRIEVAL-OUT

Press the preset-memory button for the equalization curve you want to retrieve from the memory.

Example:

When preset memory button 2 is pressed, memory number 2 will be displayed in the memory indicator part of the display, and, at the same time, that stored equalization curve will be displayed.

TO CANCEL A MEMORY RETRIEVAL-OUT

Press either a direct-equalization-level controls or a preset-memory button.

"MOST RECENT" MEMORY

The last position of the EQ level controls (whether in memory or done manually) will be automatically entered into the memory when the power is switched off. When the power is switched on, these positions will be recalled. This will not interfere any preset memory locations.

MEMORY BACK-UP

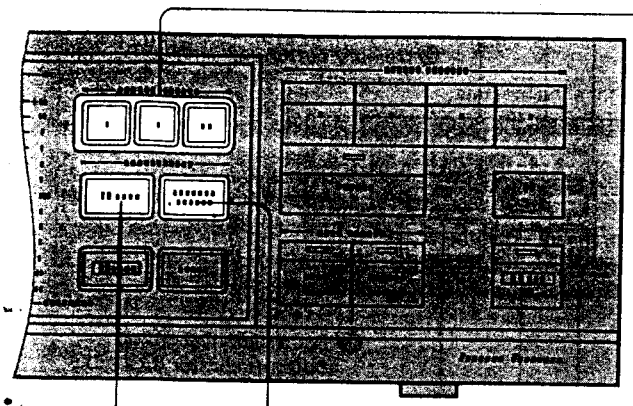
The equalization levels and equalization curves entered into the preset memories before the power is switched OFF will be held in the memory, by the gold capacitor, for about one week, even if the power cord plug is disconnected.

TO PREVENT MEMORY ERASURE

Be sure to connect this unit's power cord plug to an ordinary household electrical outlet, or to the UNSWITCHED outlet on the amplifier, in order to prevent memory erasure in the event the power of this unit is switched OFF for a week or more. Note that resettings are necessary if the memory is erased.

DISPLAY

The display can be used to display the spectrum or the equalization level.
There are two types of display for spectrum analysis: bar display or dot (=) display.



These buttons are used to select the channel for display and equalization correction.

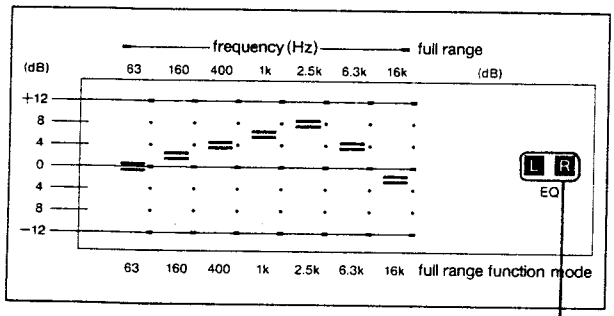
L: When this button is pressed, only the left channel is selected for equalization correction or spectrum display.

R: When this button is pressed, only the right channel is selected for equalization correction or spectrum display.

L.R: When this button is pressed, both the left and right channels are selected for simultaneous equalization correction (left channel bright, right channel dim) or spectrum display. For spectrum display, note that the value is that of the left and right channels combined.

Equalization level display

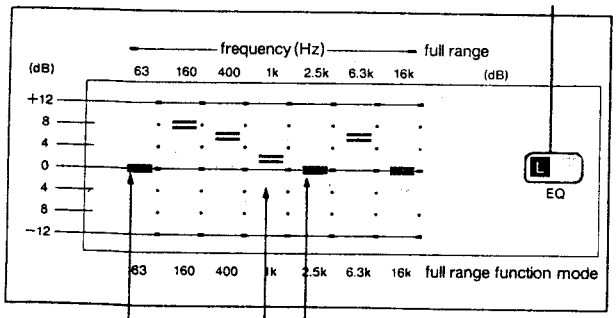
■ Display of left (L) or right (R) channel only.



Left (L) or right (R) indicator illuminates.

■ Display of left and right (L.R) channels.

Channel indicator



Left channel (bright)

Right channel (dim)

Left and right channels displayed bright at the same position.

※ If the equalization level of the left channel and of the right channel differs, the left channel indication will be bright and the right channel indication will be dim.
If the equalization level of the left and right channels is exactly the same, both indications (left and right) will be bright.

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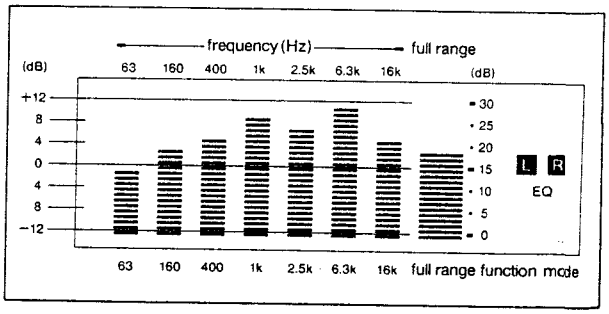
Spectrum analysis display

■ Bar-type display.



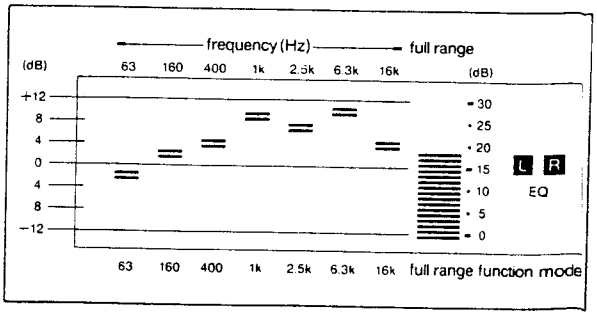
※ The "full range" area on the right side displays the combined level of all of the frequency bands.

※ If there is no input signal to this unit. The 1st row (0 dB) of all frequency bands is displayed.

When button is pressed again...

Spectrum analysis is displayed by dots (=).
Note, however, that "full range" at extreme right remains a bar display.
When the button is pressed again, the display returns to the dot (=) mode.

■ Dot (=) display.



■ EXAMPLES OF APPLICATIONS UTILIZING THE SH-8046 FUNCTIONS

The sound level of the 7 frequency divisions in the 63 Hz~16 kHz frequency range can be easily and selectively corrected by means of the direct-equalization-level controls of this unit.

1. Complete audio room correction—including the correction of both stereo equipment and room acoustics.
2. Personalized sound quality control.
3. Creating an original tape collection of tapes tailored to your car, stereo, or tapes of live recordings, etc.
4. Reduction of noise, prevention of howling. These are merely a few of the possibilities that sound quality and room acoustic correction open up for the serious listener.

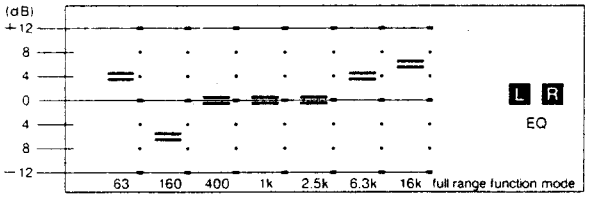
■ Correcting room acoustics

Each room has its own particular effects on frequency characteristics. These effects are determined by a number of conditions, such as room size, furnishings, etc.

The 7 separate divisions of the band level control on the SH-8046 make it possible to selectively correct only the frequency ranges necessary to suit the conditions of each listening room.

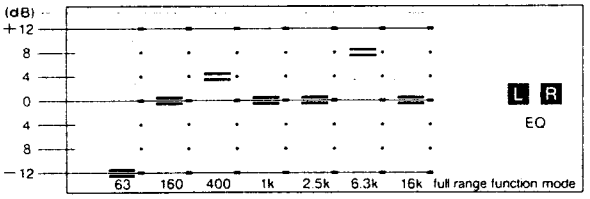
An example of room acoustics correction

In order to correct the peaks and dips in bass sounds caused by reflection, reduce the 160 Hz level 4~6 dB and then, raise the level of sounds below 63 Hz and above 6.3 kHz slightly.



■ Cutting the noise from live recording tapes

Live tapes recorded outdoors generally contain popping noises caused by wind and various other noises from the surrounding area. In order to effectively eliminate wind noise, cut bass sounds below 63 Hz and raise the level of sounds in the 400 Hz range. Then control sounds made by birds, etc., with a 6.3 kHz adjustment.

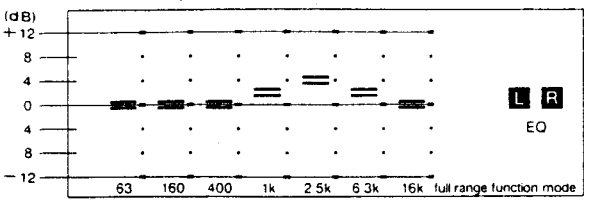


■ Producing clear vocals

For female vocals, raise the level of the 1 kHz~2.5 kHz range by 2~4 dB. To rectify omission, raise the level of the 6.3 kHz vicinity slightly.

Male vocals can be improved by raising the level of the 400 Hz~2.5 kHz range.

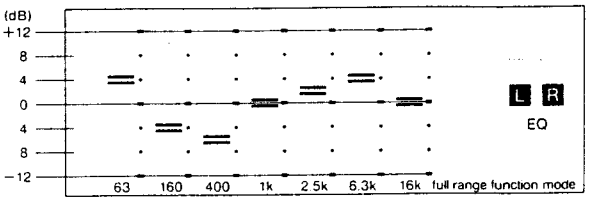
Below is an example of a female vocal correction.



■ Making tapes for car stereos

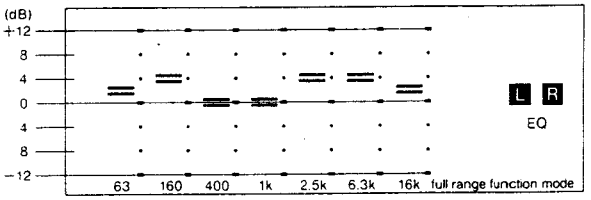
Tapes can be made exclusively for the listening conditions inside a vehicle. Merely raise the 63 Hz level 3~4 dB.

For medium and low frequencies, centering on the 400 Hz vicinity, lower the modulating effect by raising the 2.5 kHz~6.3 kHz vicinity by 2~4 dB.



■ Adding some power to disco music

Increase the power of bass guitars and bass drums by raising the level of the 63 Hz~160 Hz range, and raise the level of sounds from 2.5 kHz to 16 kHz. The result will be greatly emphasized low frequency sounds and strong, clear high frequency sounds.

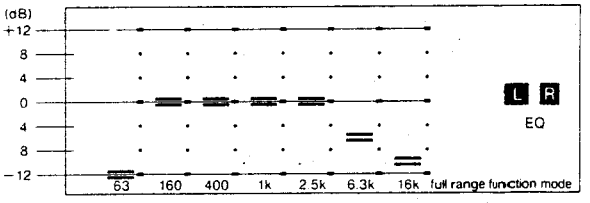


■ Cutting noise from discs

Noises from warped discs are low frequency noise components. Lowering the sound level of the 63 Hz vicinity can eliminate these.

To cut noise in old discs, set all direct-equalization level controls to the "flat" (center) position, and then move them individually to the −12 dB position to find the noise component.

Then, working from this clue, cut the noise so as not to deteriorate the tone quality.



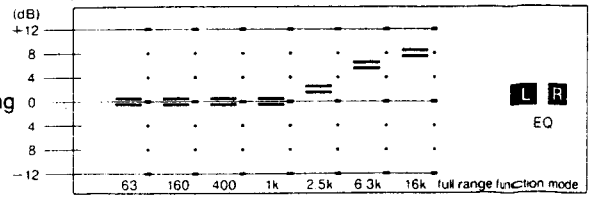
■ Reducing tape hiss

Tape hiss can be effectively reduced by slightly raising the level of high frequency (above 2.5 kHz) sounds during tape deck recording, and then lowering them during playback.

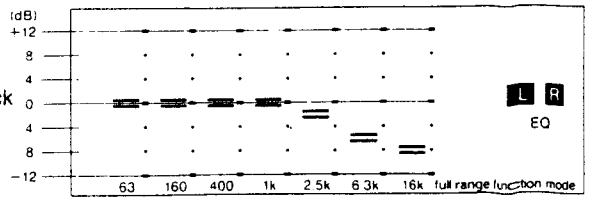
Note:

If sounds above 6.3 kHz are raised too much, distortion may result in the tape deck. Prevent this by watching the level meters of the tape deck and setting the recording levels appropriately.

recording



playback



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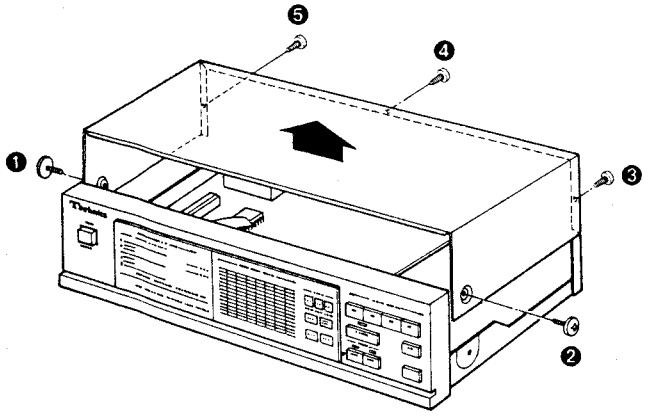
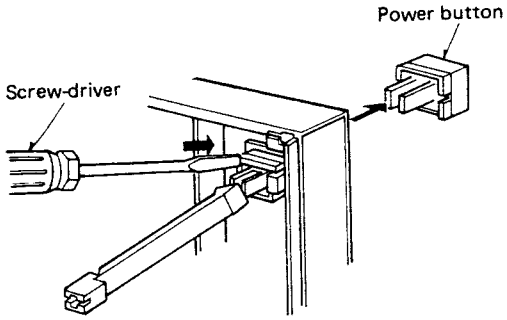
■ DISASSEMBLY INSTRUCTIONS

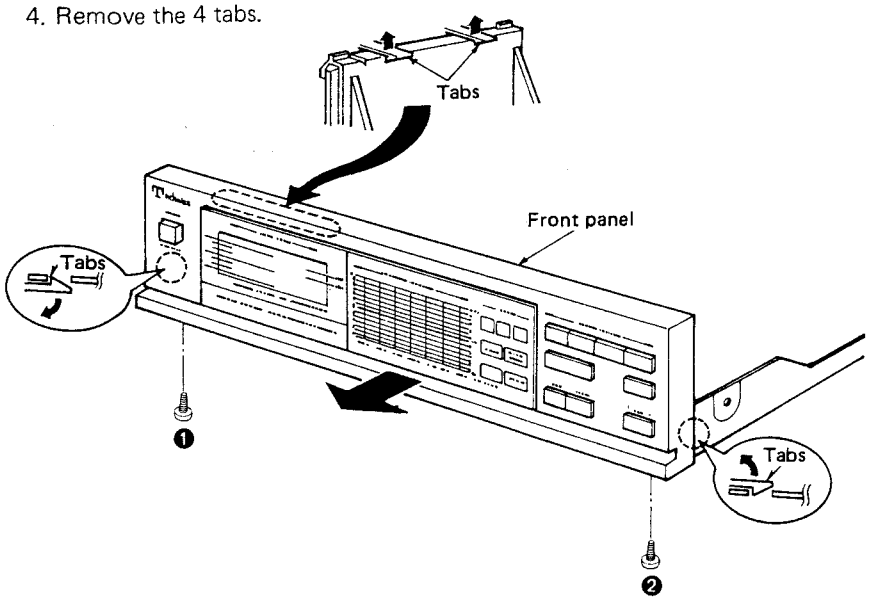
Ref. No. 1	How to remove the cabinet
Procedure 1	1. Remove the 5 screws (❶ ~ ❺).



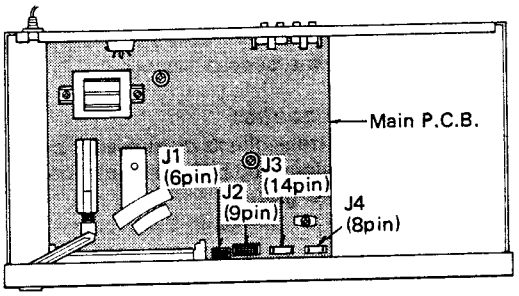
2. Remove the push a power button by screw-driver.



3. Remove the 2 screws (❶ , ❷).
4. Remove the 4 tabs.

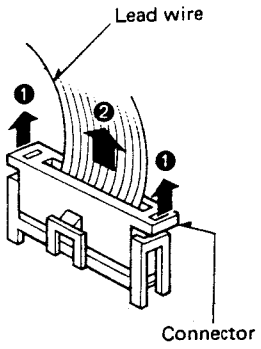


Ref. No. 2	How to remove the front panel
Procedure 1 →2	1. Pull off lead wire at 4 connectors (J1, 2, 3, 4).

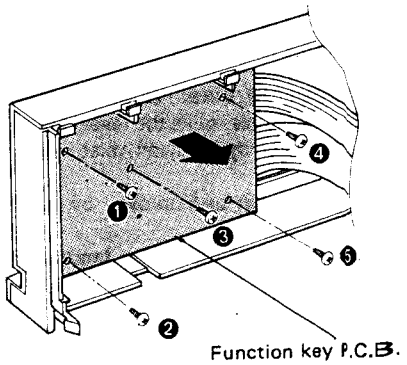


Note:
How to remove the connectors (J3, 4)

1. Drow up a connector as direction of arrow ❶ .
2. Pull off lead wire as direction of arrow ❷ .
3. When fixing connector in lead wire, fit in order of inversion.



Ref. No. 3	How to remove the function key P.C.B.
Procedure 1 →3	1. Remove the 5 screws (❶ ~ ❺).



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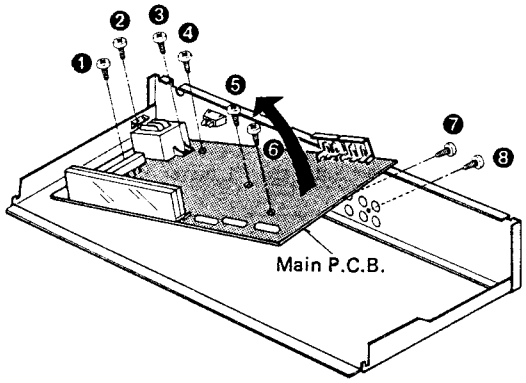
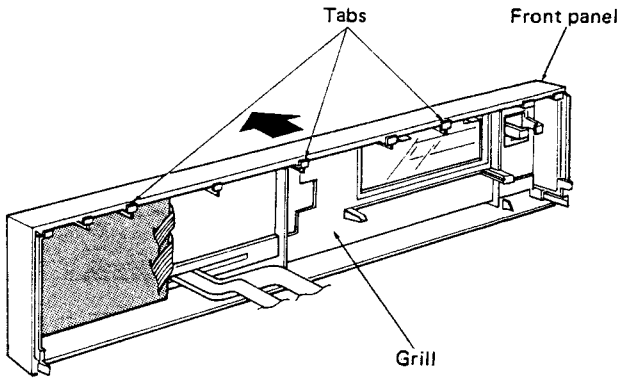
Ref. No. 4	How to remove the main P.C.B.
Procedure 1 →2 →4	1. Remove the 8 screws (❶ ~ ❽) raise the main P.C.B. as shown by curved arrow.



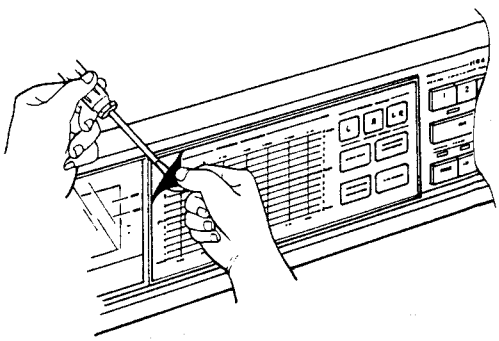
Ref. No. 5	How to remove the grill
Procedure 1 →2 →5	1. Push down the 3 tabs. 2. Remove the front panel from chassis as direction of arrow.



Ref. No. 6	Exchange of direct EQ level and control switch
Procedure 6	

When exchanging switch only from the reason of injury or dirt on its surface, peel it off by raising it at the four corners with a screw-driver as shown in the right figure.
Switch peeled off shall not be used again.

* The switch is supplied sticked on the "grill" of repair parts.



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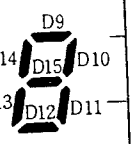
■ FUNCTION OF IC'S

• Micro-computer (IC13) HD614042SD15

Pin No.	Notation	Object of Function	
		Input	Output
1	D_{11}	+2dB line & Lch, memory 4 key input to key scan	+2dB segment output to FL meter 8 segment output
2	D_{12}	+4dB line & lock, EQ on/off key input to key scan	+4dB segment output to FL meter 8 segment output
3	D_{13}	+6dB line & spectrum analyzer key input to key scan	+6dB segment output to FL meter 8 segment output
4	D_{14}	+8dB line & Rch key input to key scan	+8dB segment output to FL meter 8 segment output
5	D_{15}	+10dB line & Reverse key input to key scan	+10dB segment output to FL meter 8 segment output
6	R_{00}	—	Grid output of 63Hz to FL meter & line output for 63Hz of key scan
7	R_{01}	—	Grid output of 160Hz to FL meter & line output for 160Hz of key scan
8	R_{02}	—	Grid output of 400Hz to FL meter & line output for 400Hz of key scan
9	R_{03}	—	Grid output of 1kHz to FL meter & line output for 1kHz of key scan
10	R_{10}	—	Grid output of 2.5kHz to FL meter & line output for 2.5kHz of key scan
11	R_{11}	—	Grid output of 6.3kHz to FL meter & line output for 6.3kHz of key scan
12	R_{12}	—	Grid output of 16kHz to FL meter & line output for 16kHz of key scan
13	R_{13}	—	All band grid output for FL meter
14	R_{20}	—	Lch, Rch, EQ, lock, reverse, 8 grid output for FL meter
15	R_{21}	—	Spectrum analyzer scale segment output to FL meter
16	R_{22}	—	EQ level scale segment output to FL meter
17	R_{23}	+12dB line & Lch, Rch key input to key scan	+12dB segment output to FL meter
18	$\overline{R}_{AO}$	Input terminal of A/D	—
19	R_{AI}/V	Output power source terminal (−32V) of high voltage withstanding terminal (D4~D15, R_{00}~R_{13}, R_{20}~R_{23})	—
20	R_{30}	—	—
21	R_{31}	—	—
22	R_{32}/INTO	Input terminal for external interruption to MCU H . . . . . active mode L . . . . . stop mode	—
23	R_{33}/INTI	—	—
24	R_{50}	—	Output for controlling data of IC2 (TC9164N)
25	R_{51}	—	Output for controlling data of IC6 (LC7522)
26	R_{52}	—	Output for controlling data of IC5 (LC7522)
27	R_{53}	—	Output for controlling strobe of IC 2 (TC9164N)
28	R_{60}	—	Output for lighting LED for tape
29	R_{61}	—	Output for lighting LED for source
30	R_{62}	—	Output for lighting LED for rec
31	R_{63}	—	Output for lighting LED for memory
32	V_{CC}	5V source	—



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Pin No.	Notation	Object of Function	
		Input	Output
33	R_{40}/SCK	—	Data A output of IC12 (HD14051)
34	R_{41}/SI	—	Data B output of IC12 (HD14051)
35	R_{42}/SO	—	Data C output of IC12 (HD14051)
36	R_{43}	—	Output for controlling lock of IC2 (TC9164N)
37	R_{70}	—	A/D conversion data bit 0 output
38	R_{71}	—	A/D conversion data bit 1 output
39	R_{72}	—	A/D conversion data bit 2 output
40	R_{73}	—	A/D conversion data bit 3 output
41	R_{80}	—	A/D conversion data bit 4 output
42	R_{81}	—	A/D conversion data bit 5 output
43	R_{82}	—	A/D conversion data bit 6 output
44	R_{83}	—	A/D conversion data bit 7 output
45	R_{90}	Selection for indication of spectrum analyzer H . . . . . bar indication only L . . . . . bar/dot indication select	—
46	R_{91}	—	—
47	R_{92}	—	—
48	R_{93}	—	—
49	RESET	Terminal for resetting MCU	—
50	TEST	—	—
51	OSC1	Input terminal for internal oscillator	—
52	OSC2	Input terminal for internal oscillator	—
53	GND	—	Ground
54	D_0	—	Output for controlling clock of IC5, 6 (LC7522)
55	D_1	—	For muting music sound H . . . . . on L . . . . . off
56	D_2	—	Key output for key scan Lch, Rch, reverse, Rch, spectrum Analyzer, lock, EQ
57	D_3	—	Key output for key scan EQ on/off, memory, memory 1, 2, 3, 4, rec, tape, source
58	D_4	−12dB line & tape key input to key scan	−12dB segment output to FL meter reverse segment output
59	D_5	−10dB line & source key input to key scan	−10dB segment output to FL meter lock segment output
60	D_6	−8dB line & rec key input to key scan	−8dB segment output to FL meter EQ segment output
61	D_7	−6dB line & memory key input to key scan	−6dB segment output to FL meter [L] segment output
62	D_8	−4dB line & memory 1 key input to key scan	−4dB segment output to FL meter [R] segment output
63	D_9	−2dB line & memory 2 key input to key scan	−2dB segment output to FL meter 8 segment output
64	D_{10}	0dB line & memory 3 key input to key scan	0dB segment output to FL meter 8 segment output

● Electronic volume (IC5, 6) LC7522

Pin No.	Notation	Object of Function
1	V_{DD}	Power supply terminal (for sound signal)
2 (27)	IN1	Sound signal input terminal. Pin 2 is not connection

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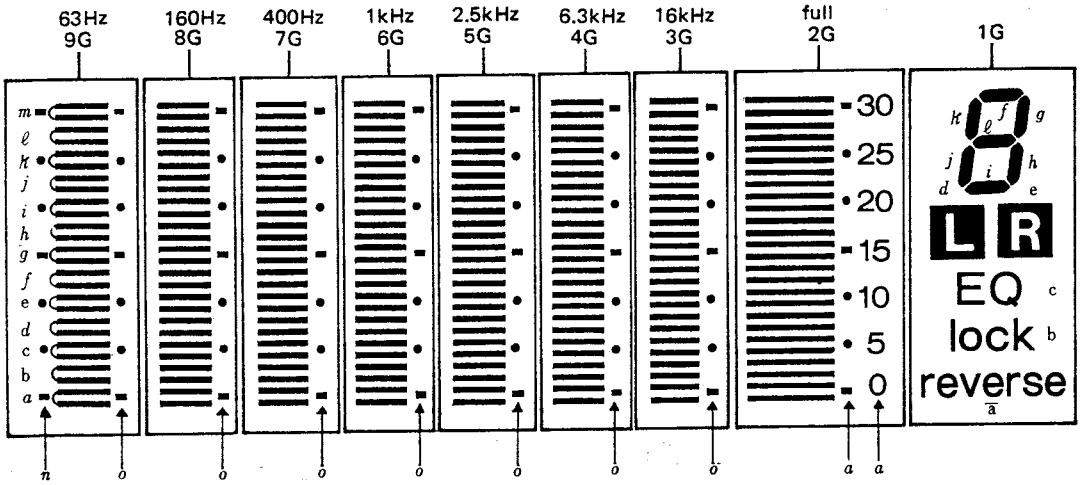
Pin No.	Notation	Object of Function
3 (26)	IN2	Sound signal input terminal. Pin 3 is not connection
4 (25) ≀ 10 (19)	f_7 ≀ f_1	Band filter connection terminal. Pin 4—10 are not connection
11 (12)	TEST 2 TEST 1	Non connection
13	S	—
14	V_{EE}	Power supply terminal (for sound signal)
15	V_{CC}	Power supply terminal
16	D1	Terminal for data signal input from micro-computer (IC13)
17	CLK	Terminal for clock signal input from micro-computer (IC13)
18	V_{SS}	Ground

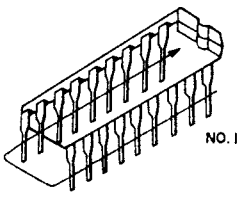
■ GRID AND SEGMENT OF FL DISPLAY TUBE



F : filament, 1G～9G : grids, a～n : segments, NP : vacant terminals

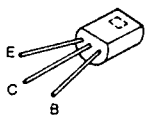
Segment terminal No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Name of terminal	F 1	F 1	NP	9 G	NP	9 G	NP	NP	8 G	NP	NP	NP	7 G	NP	NP	6 G	NP	O	5 G	n	m	l	4 G	k	j	3 G	i	h	2 G	g	f	2 G	e	d	1 G	c	b	a	1 G	NP	F 2	F 2

■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES

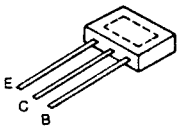


LA6324	14 Pin
HD14051BP	16 Pin
M5229P	20 Pin
TC9164N LC7522	28 Pin
HD614042SD15	64 Pin

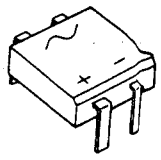
2SA1015-Y
2SC1815L-G
2SC2878A-T



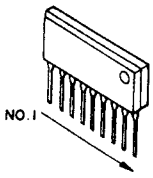
2SA1309Q
2SC3311-Q



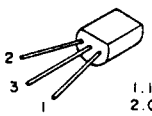
SVD1B4B42



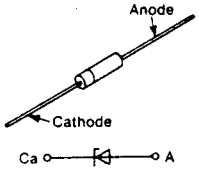
M5223L	8 Pin
SVITA75559S	9 Pin



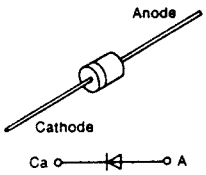
L78N05



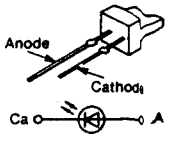
MA2150B
MA4068M
MA4075M



SVD1SS119-04
SVD1SR35200A



LN224WP



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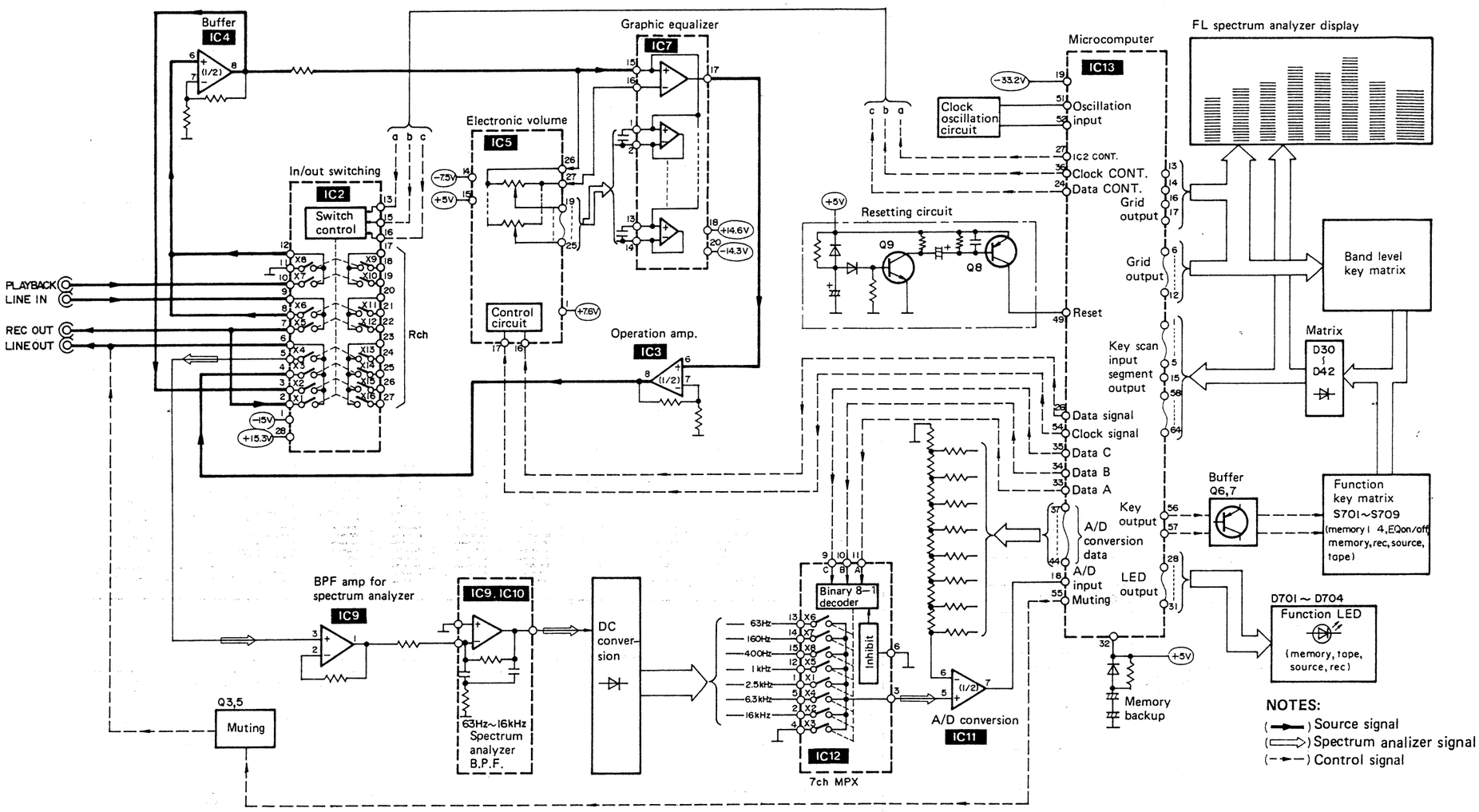
■ BLOCK DIAGRAM



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

Note 1:

1. **S1-1~S1-4, S1-6**: Power switch in "**on**" position. (S1-6 is muting switch that prevent flickering of FL and/or LED as a result of malfunction of microcomputer and change of equalizer level when power is put ON/OFF.)
2. **S2**: Voltage selection switch in "**240 V**" position. [XA, PA, PE areas.] (110V ↔ 127V ↔ 220V ↔ 240V)
3. **S701~S704**: Preset-memory switch. (memory 1 ~ memory 4)
4. **S705**: Equalization ON/OFF (EQ) switch in "**off**" position
5. **S706**: Memory switch in "**off**" position.
6. **S707**: Equalization-record switch in "**off**" position.
7. **S708, S709**: Input selection switch. (sourse, tape)
8. Direct equalizer level control key matrix circuit includes switches that "vary all frequencies in the range of ±12dB", "LOCK" switch, "Reverse" switch, "Display mode" switch and channel select "switch".
9. All voltage values shown in circuitry are the standard values for the DC electronic circuit tester (high-impedance) with the ground point taken as standard.
   Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

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• Function of IC2 (TC9164N)

Input select switch position \ IC's switch No.		X1	X2	X3	X4	X5	X6	X7	X8
Source	EQ Switch off / REC Switch off	on	on	off	*	off	on	off	off
	EQ Switch on / REC Switch off	off	off	on	*	on	on	off	off
	REC Switch on / REC Switch on	on	off	on	*	off	on	off	off

Input select switch position \ IC's switch No.		X1	X2	X3	X4	X5	X6	X7	X8
Tape	EQ Switch off	off	on	off	*	on	off	on	off
	EQ Switch on	off	off	on	*	on	off	on	off

* X4 use for spectrum analyzer, Lch-Rch selection.

*** NOTICE: IC & LSI are weak to static charge !!**

In repair work, delicate care prevents secondary fault.

- Stick aluminium foil on the surface of resin-made container for parts.
- Ground soldering iron.
- Use conductive mat to work on.
- Don't hold legs of IC & LSI with fingers directly.
- Start repair work after discharging memory holding gold capacitors C16 and C17 (2.3V, 3.3 F).

A MAIN CIRCUIT SECTION

IC3, 4
SVITA75559S
or SVINJM4559SE
BUFFER/OPERATION AMP

IC2
TC9164N
IN/OUT
CONTROL

IC5
IC6
IC7 (L ch)
IC8 (R ch)
IC5, 6
LC7522
BAND LEVEL
CONTROL

IC7, 8
M5229P
GRAPHIC
EQUALIZER

IC11
M5223L
A/D CONV.

IC9
IC10
IC9, 10
LA6324
SPECTRUM ANALYZER
BAND PASS FILTER

Q4, 5
2SC2878
MUTING

Q3
2SA1309
MUTING

Equalizer signal

Spectrum
analyzer
signal

LINE OUT
REC OUT
LINE IN
PLAY BACK
Except
(M)(MC)areas
(M)(MC)areas

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B EQ LEVEL CONTROL KEY CIRCUIT SECTION

C FUNCTION KEY CIRCUIT SECTION

Q6,7 2SA1309 BUFFER

IC13 HD614042SD15 MICRO COMPUTER

Q10 2SC2878 MUTING

IC12 HD14051BP 7ch, MPX

Q8 2SA1309 RESET

Q9 2SC3311 RESET

IC1 L78N05 REGULATOR

Q1 2SA1015 REGULATOR

Q2 2SC1815 REGULATOR

Note 2.

1. Important safety notice:
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
2. Signal line
   Source signal
   Spectrum analyzer signal
   + B (— B) line.

(E)(EK)(EH)(EB)(EF)(EGA)(EI)(XL) areas.

AC 240V(50/60Hz) ----(EK)(XL)
AC 220V(50/60Hz) ---(E)(EH)(EB)(EF)(EGA)(EI)

(XA)(PA)(PE) areas.

AC 110V/127V/220V/240V (50/60Hz)

(M)(MC) areas

AC 120V (60Hz)

PRINTED CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

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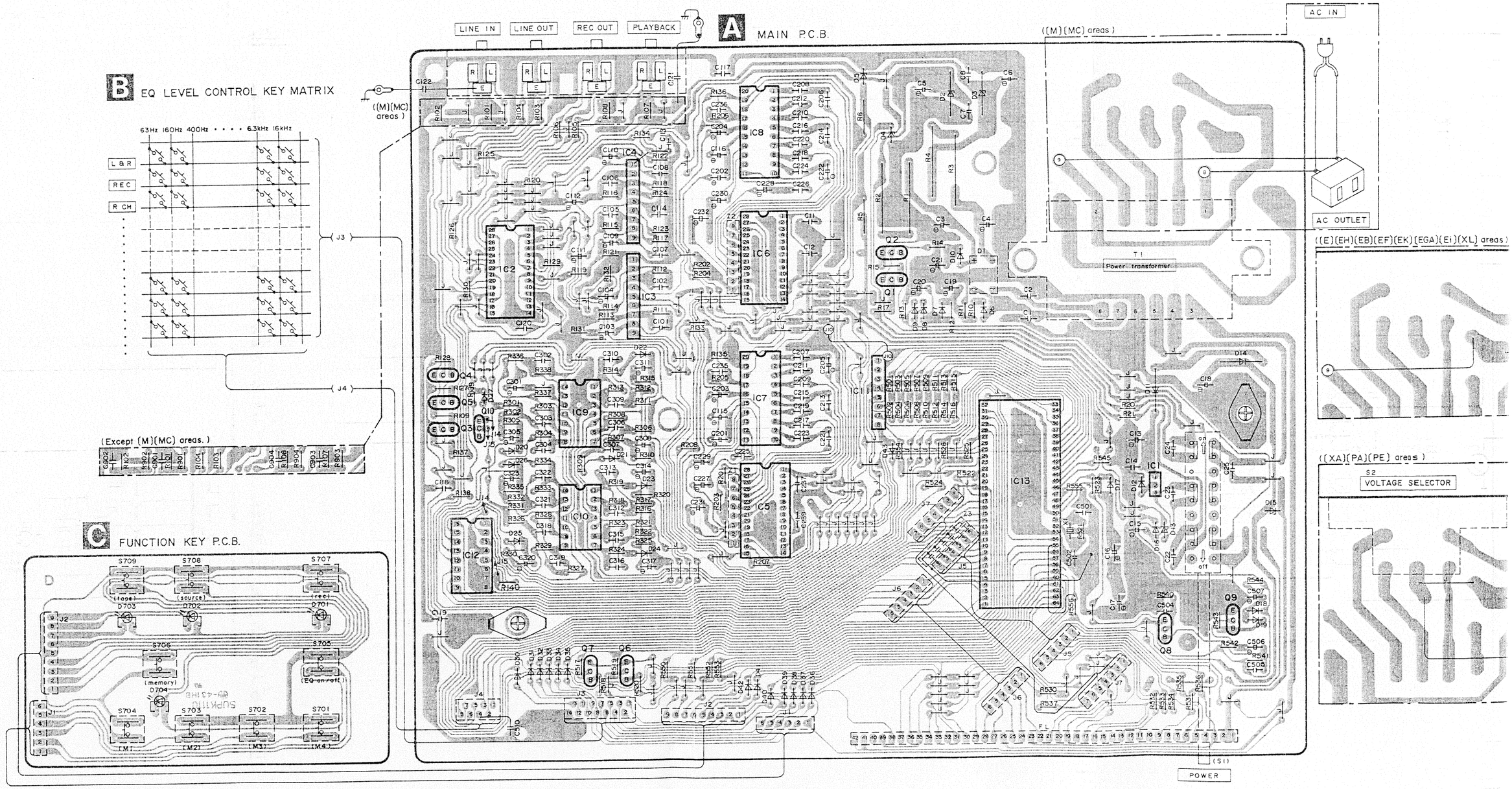
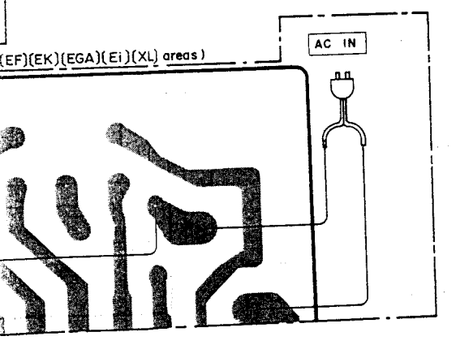
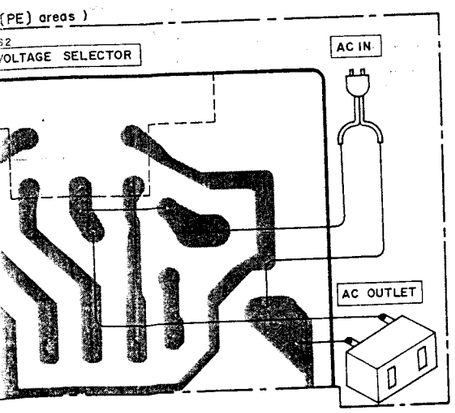
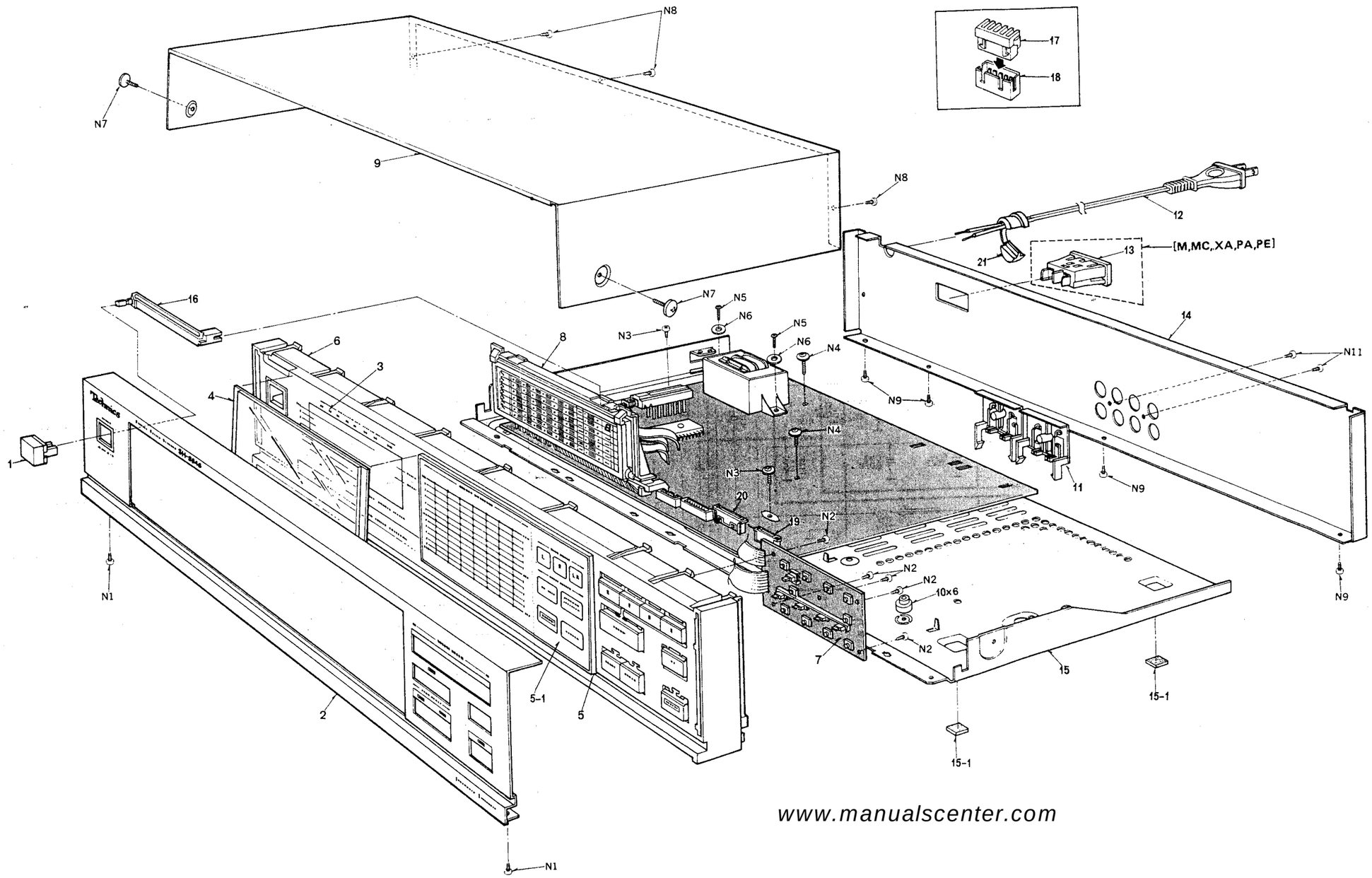






■ EXPLODED VIEW



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■ REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. Ⓚ — marked parts are used for black only, while ○ — marked parts are for silver type only.
4. Part other than Ⓚ— and ○ — marked are used for both black and silver type.
5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
6. The " Ⓢ " mark is service standard parts and may differ from production parts.
7. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.		Part No.	Description
INTEGRATED CIRCUITS			
IC1 [other]	⚠	L78N05	IC
IC1 [EK,XL]	⚠	AN78N05	IC
IC2		TC9164N	IC
IC3, 4		SVITA75559S	IC
IC5, 6		LC7522	IC
IC7, 8		M5229P	IC
IC9, 10		LA6324	IC
IC11		M5223L	IC
IC12		HD14051BP	IC
IC13		HD614042SD15	IC
TRANSISTORS			
Q1		2SA1015Y	Transistor
Q2		2SC1815L—G	Transistor
Q3, 6, 7, 8		2SA1309Q	Transistor
Q4, 5, 10		2SC2878A—T	Transistor
Q9		2SC3311—Q	Transistor
DIODES			
D1	⚠	SVD1B4B42	Diode
D2, 3		MA2150B	Diode
D4, 5		MA4075M	Diode
D6~10, 12, 13, 16~27, 30~43	⚠	SVD1SS119—04	Diode
D11, 14	⚠	SVD1SR35200	Diode
D15		MA4068M	Diode
D701~704		LN224WP	LED
TRANSFORMER			
T1 [M, MC]	⚠	SLTK5K6	Power Supply
T1 [XA, PA, PE]	⚠	SLTK5K7	Power Supply
T1 [E, EH, EGA] [EB, EF, EI]	⚠	SLTK5K8	Power Supply
T1 [EK, XL]	⚠	SLTK5K9	Power Supply
CRYSTAL			
X1		SVFCSA400MG	Crystal OSC
FLUORESCENT DISPLAY TUBE			
FL1		SADBG350Z	Spectrum Analyzer
COMPONENT COMBINATIONS			
Z1, 2		RGLD7X224J	Component Combination
Z3		PJB7XC331M	Component Combination
SWITCHES			
S1	⚠	SSHK60	Power
S2 [XA, PA, PE]	⚠	SSR187—1	Voltage Selector
S701~709		SSG13	Pre—Set

Ref. No.		Part No.	Description	
CABINET and CHASSIS				
1	○	SBC666	Button, Power (Silver Type)	(1)
1	Ⓚ	SBC666—3	Button, Power (Black Type)	(1)
2	○	SGWH8046—SM	Front Panel Ass'y (Silver Type)	(1)
2	Ⓚ	SGWH8046—KM	Front Panel Ass'y (Black Type)	(1)
3	○	SUDK14—1	FL Filter (Silver Type)	(1)
3	Ⓚ	SUDK14	FL Filter (Black Type)	(1)
4		SGUK17	FL Tinted Plate	(1)
5	○	SGXH8046—SM	Membrane Switch Ass'y (Silver Type)	(1)
5	Ⓚ	SGXH8046—KN1	Membrane Switch Ass'y (Black Type)	(1)
5-1	○	SSEK17—1	Membrane Switch (Silver Type)	(1)
5-1	Ⓚ	SSEK17	Membrane Switch (Black Type)	(1)
6	○	SYEK35—1	Front Grille (Silver Type)	(1)
6	Ⓚ	SYEK35	Front Grille (Black Type)	(1)
7		SDUK13	Holder, LED	(11)
8		SHRK933	Holder, FL	(1)
9	○	SKCK170S98	Cabinet (Silver Type)	(1)
9	Ⓚ	SKCK170K99	Cabinet (Black Type)	(1)
10		SHE187	Holder, P.C.B.	(6)
11		SJF3057N	Terminal	(2)
12 [M]	⚠	RJA9YA—Y	AC Cord	(1)
12 [MC]	⚠	SJA169	AC Cord	(1)
12 [EK]	⚠	QFC1205M	AC Cord	(1)
12 [XL]	⚠	SJAG23	AC Cord	(1)
12 [PA, PE]	⚠	RJA52YAK	AC Cord	(1)
12 [other]	⚠	SJA138—3	AC Cord	(1)
13 [M, XA, PA, PE]	⚠	SJS9221—1	AC Outlet	(1)
13 [MC]	⚠	SJS9223	AC Outlet	(1)
14 [M, MC]		SGPK350—1A	Rear Panel	(1)
14 [E]		SGPK350—3A	Rear Panel	(1)
14 [EGA]		SGPK350—3B	Rear Panel	(1)
14 [EH, EB, EF, EI]		SGPH8046—KF	Rear Panel Ass'y	(1)
14 [EK]		SGPK350—3C	Rear Panel	(1)
14 [XL]		SGPK350—3D	Rear Panel	(1)
14 [XA, PA, PE]		SGPK350—4A	Rear Panel	(1)
15 [M]		SKUH8046—KM	Chassis Ass'y	(1)
15 [MC]		SKUH8046—KN	Chassis Ass'y	(1)
15 [other]		SKUH8046—KE	Chassis Ass'y	(1)
15-1		SKL293	Foot	(4)
16		SUBK17	Connection Rod	(1)
17		SJS50671DS	Connector, 6P (J1)	(1)
17		SJS50971DS	Connector, 9P (J2)	(1)

Ref. No.		Part No.	Description	
CABINET and CHASSIS				
18		SJT3611	Post, 6P (J1)	(1)
18		SJT3907	Post, 9P (J2)	(1)
19		SJS51473SK	Socket, 14P (J3)	(1)
20		SJS50873SK	Socket, 8P (J4)	(1)
21 [M, MC]		RHR111	Bushing, AC Cord	(1)
21 [EK]		SHR129	Bushing, AC Cord	(1)
21 [other]		SHR127	Bushing, AC Cord	(1)
SCREWS AND WASHERS				
N1		XTB3+10GFZ	Tapping ⊕3×10	(4)
N2		XTB3+10GFYR	Tapping ⊕3×10	(5)
N3		XTBS3+20F1	Tapping ⊕3×20	(2)
N4		XTW3+20T	Tapping ⊕3×20	(2)
N5		XTB3+25J	Tapping ⊕3×25	(2)
N6		SNW3211	Washer	(2)
N7	○	SNE2095—4	Cabinet (Silver Type)	(2)
N7	Ⓚ	SNE2095—5	Cabinet (Black Type)	(2)
N8		XTB3+8BFZ	Tapping ⊕3×8	(3)
N9		XTB3+12B	Tapping ⊕3×12	(4)
ACCESSORIES				
A1 [M]		SQFK10123	Instruction Book	(1)
A1 [MC]		SQFK10124	Instruction Book	(1)
A1 [EGA]		SQFK10126	Instruction Book	(1)
A1 [PA, PE]		SQFK10127	Instruction Book	(1)
A1 [other]		SQFK10125	Instruction Book	(1)
A2		SJPK2201	Connection Cord (Pin, 0.8m)	(2)
A3 [PA, PE]	⚠	SJP9215	Plug, ACAdaptor	(1)
A3 [XA]	⚠	SJP5213—1	Plug, ACAdaptor	(1)
PACKING				
P1 [M]	Ⓚ	SPGK212	Carton Box (Black Type)	(1)
P1 [MC]	○	SPGK231	Carton Box (Silver Type)	(1)
P1 [MC]	Ⓚ	SPGK213	Carton Box (Black Type)	(1)
P1 [EK]	○	SPGK232	Carton Box (Silver Type)	(1)
P1 [EK]	Ⓚ	SPGK216	Carton Box (Black Type)	(1)
P1 [EF]	○	SPGK2333	Carton Box (Silver Type)	(1)
P1 [EF]	Ⓚ	SPGK215	Carton Box (Black Type)	(1)
P1 [XL]	○	SPGK234	Carton Box (Silver Type)	(1)
P1 [XL]	Ⓚ	SPGK217	Carton Box (Black Type)	(1)
P1 [other]	○	SPGK230	Carton Box (Silver Type)	(1)
P1 [other]	Ⓚ	SPGK214	Carton Box (Black Type)	(1)
P2 [XL]		SPSK91—1	Pad, Left Side	(1)
P2 [other]		SPSK91	Pad, Left Side	(1)
P3 [XL]		SPSK92—1	Pad, Right Side	(1)
P3 [other]		SPSK92	Pad, Right Side	(1)
P4	○	SPP725	Polyethylne Sheet (Silver Type)	(1)
P4	Ⓚ	SPPK48	Polyethylne Sheet (Black Type)	(1)

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Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W 2F : 1/4W S2 : 1/4W	J : ±5%

The unit of resistance is Ω(ohm), K = 1000Ω, M = 1000kΩ.
The unit of capacitance is μF (microfarad). P = 10^{-6} μF

Numbering System of Capacitor

Example

ECKD	1H	102	Z	F
Type	Volgage	Value	Tolerance	Peculiarity

Capacitor Type	Voltage	Tolerance
ECEA : Electrolytic	0J : 6.3V	K : ±10%
ECCD : Ceramic	1A : 10V	Z : +80%, −20%
ECKD : Ceramic	1C : 16V	M : ±20%
ECF : Semi-conductor	1E : 25V	
ECQV : Polyester	D : 25V	
ECQM : Polyester	1H : 50V	
EECW : Liquid electrolyte dubble layer	1V : 35V	
	2R3 : 2.3V	

● RESISTORS

Ref. No.	Part No.	Value
R1, 2	ERG2ANJ680	68
R3, 4	ERG2ANJ680	68
R5, 6	ERDS2TJ821	820
R10	ERDS2TJ222	2.2K
R11	ERDS2TJ472	4.7K
R12	ERDS2TJ473	47K
R13	ERDS2TJ273	27K
R14	ERDS2TJ562	5.6K
R15	ERDS2TJ103	10K
R17	ERDS2TJ224	220K
R20, 21	ERDS2TJ220	22
R101, 102	ERDS2TJ104	100K
R103, 104	ERDS2TJ331	330
R105, 106	ERDS2TJ331	330
R107, 108	ERDS2TJ104	100K
R109	ERDS2TJ103	10K
R111, 112	ERDS2TJ123	12K
R113, 114	ERDS2TJ183	18K
R115, 116	ERDS2TJ472	4.7K
R117, 118	ERDS2TJ473	47K
R119, 120	ERDS2TJ102	1K
R121, 122	ERDS2TJ154	150K
R123, 124	ERDS2TJ104	100K
R125, 126	ERDS2TJ222	2.2K
R127, 128	ERDS2TJ102	1K
R129, 130	ERDS2TJ224	220K
R131, 132	ERDS2TJ104	100K
R133, 134	ERDS2TJ123	12K
R135, 136	ERDS2TJ273	27K
R137	ERDS2TJ104	100K
R138	ERDS2TJ103	10K

Ref. No.	Part No.	Value
R139, 140	ERDS2TJ102	1K
R201, 202	ERDS2TJ224	220K
R203, 204	ERDS2TJ224	220K
R205, 206	ERDS2TJ682	6.8K
R207, 208	ERDS2TJ123	12K
R301	ERDS2TJ822	8.2K
R302	ERDS2TJ333	33K
R303	ERDS2TJ154	150K
R304	ERDS2TJ272	2.7K
R305	ERDS2TJ224	220K
R306	ERDS2TJ822	8.2K
R307	ERDS2TJ273	27K
R308	ERDS2TJ154	150K
R309	ERDS2TJ152	1.5K
R310	ERDS2TJ224	220K
R311	ERDS2TJ822	8.2K
R312	ERDS2TJ333	33K
R313	ERDS2TJ154	150K
R314	ERDS2TJ821	820
R315	ERDS2TJ224	220K
R316	ERDS2TJ562	5.6K
R317	ERDS2TJ333	33K
R318	ERDS2TJ154	150K
R319	ERDS2TJ681	680
R320	ERDS2TJ274	270K
R321	ERDS2TJ822	8.2K
R322	ERDS2TJ333	33K
R323	ERDS2TJ154	150K
R324	ERDS2TJ272	2.7K
R325	ERDS2TJ224	220K
R326	ERDS2TJ822	8.2K

Ref. No.	Part No.	Value
R327	ERDS2TJ333	33K
R328	ERDS2TJ154	150K
R329	ERDS2TJ272	2.7K
R330	ERDS2TJ224	220K
R331	ERDS2TJ223	22K
R332	ERDS2TJ103	10K
R333	ERDS2TJ474	470K
R334	ERDS2TJ182	1.8K
R335	ERDS2TJ224	220K
R336	ERDS2TJ154	150K
R337	ERDS2TJ104	100K
R338	ERDS2TJ334	330K
R501	ERDS2TJ223	22K
R502	ERDS2TJ123	12K
R503	ERDS2TJ223	22K
R504	ERDS2TJ123	12K
R505	ERDS2TJ223	22K
R506	ERDS2TJ123	12K
R507	ERDS2TJ223	22K
R508	ERDS2TJ123	12K
R509	ERDS2TJ223	22K
R510	ERDS2TJ123	12K
R511	ERDS2TJ223	22K
R512	ERDS2TJ123	12K
R513	ERDS2TJ223	22K
R514	ERDS2TJ123	12K
R515, 516	ERDS2TJ223	22K
R517	ERDS2TJ104	100K
R518	ERDS2TJ103	10K
R519	ERDS2TJ104	100K
R520	ERDS2TJ103	10K

Ref. No.	Part No.	Value
R521	ERDS2TJ684	680K
R522	ERDS2TJ103	10K
R523	ERDS2TJ561	560
R524, 525	ERDS2TJ103	10K
R526	ERDS2TJ103	10K
R530, 531	ERDS2TJ472	4.7K
R532, 533	ERDS2TJ472	4.7K
R534, 535	ERDS2TJ472	4.7K
R536	ERDS2TJ472	4.7K
R537	ERDS2TJ182	1.8K
R540	ERDS2TJ103	10K
R541, 542	ERDS2TJ332	3.3K
R543	ERDS2TJ473	47K
R544	ERDS2TJ682	6.8K
R545	ERDS2TJ104	100K
R550, 551	ERDS2TJ471	470
R552, 553	ERDS2TJ471	470
R554	ERDS2TJ103	10K
R555	ERDS2TJ104	100K
R556	ERDS2TJ224	220K
R901, 902 Except [M, MC]	ERDS2TJ102	1K
R903, 904 Except [M, MC]	ERDS2TJ102	1K

● CAPACITORS

Ref. No.	Part No.	Value
C1, 2 ⚠	ECKD1H223ZF	0.022
C3, 4	ECEA1VU471	470
C5, 6	ECEA1EU471	470
C7, 8	ECKD1H223ZF	0.022
C9, 10	ECEA1EU221	220
C11, 12	ECKD1H223ZF	0.022
C13	ECEA1VU471	470
C14	ECKD1H223ZF	0.022
C15	ECEA1AU470	47
C16, 17	EECW2R3A3R3	3.3F
C18 ⚠	ECEA1HU221	220
C19	ECEA1EU4R7	4.7
C20	ECEA0JU101	100
C21	ECEA1VU101	100
C22, 23	ECKD1H223ZF	0.022
C24, 25	ECKD1H223ZF	0.022
C101, 102	ECCD1H101K	100P
C103, 104	ECEA1HU3R3	3.3
C105, 106	ECCD1H101K	100P
C107, 108	ECCD1H101K	100P
C109, 110	ECEA1EU4R7	4.7
C111, 112	ECEA1EU221	220

Ref. No.	Part No.	Value
C113, 114	ECKD1H223ZF	0.022
C115, 116	ECEA1HU3R3	3.3
C117, 118	ECKD1H223ZF	0.022
C119	ECKD1H223ZF	0.022
C120	ECKD1H181KB	180P
C121, 122	ECKD1H223ZF	0.022
C201, 202	ECEA1HU3R3	3.3
C203, 204	ECEA1HU3R3	3.3
C205	ECEA1HUR15	0.15
C206	ECFTD472KXL	0.0047
C207	ECFTD333KXL	0.033
C208	ECKD1H681KB	680P
C209	ECFTD683KXL	0.068
C210	ECFTD103KXL	0.01
C211	ECFTD153KXL	0.015
C212	ECFTD222KXL	0.0022
C213, 214	ECFTD273KXL	0.027
C215, 216	ECFTD562KXL	0.0056
C217	ECFTD103KXL	0.01
C218	ECFTD683KXL	0.068
C219	ECFTD222KXL	0.0022
C220	ECFTD153KXL	0.015

Ref. No.	Part No.	Value
C221	ECFTD472KXL	0.0047
C222	ECEA1HUR15	0.15
C223	ECKD1H681KB	680P
C224	ECFTD333KXL	0.033
C225, 226	ECFTD823KXL	0.082
C227, 228	ECEA1HUR47	0.47
C229, 230	ECEA1HUR22	0.22
C231, 232	ECEA1HU010	1
C235, 236	ECKD1H471KB	470P
C237	ECKD1H223ZF	0.022
C239	ECKD1H223ZF	0.022
C301	ECEA1HU010	1
C302	ECCD1H560K	56P
C303, 304	ECFTD472KXL	0.0047
C305	ECEA11HU010	1
C306, 307	ECFTD222KXL	0.0022
C308	ECEA1HU010	1
C309, 310	ECKD1H821KB	820P
C311	ECEA1HU010	1
C312, 313	ECKD1H391KB	390P
C314	ECEA1HU010	1
C315, 316	ECFTD123KXL	0.012

Ref. No.	Part No.	Value
C317	ECEA1HU010	1
C318, 319	ECFTD333KXL	0.033
C320	ECEA1HU010	1
C321, 322	ECFTD473KXL	0.047
C323	ECEA1HU010	1
C501, 502	ECCD1H330K	33 P
C504	ECFTD102KXL	0.001
C505	ECKD1H223ZF	0.022
C506	ECEA1EU4R7	4.7
C507	ECEA1AU470	47
C510	ECKD1H331KB	330 P
C901, 902 Except [M, MC]	ECCD1H101K	100 P
C903, 904 Except [M, MC]	ECCD1H101K	100 P

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